

SOLUTIONS MANUAL



Chapter 1 – The World of the Systems Analyst

Solutions to End-of-Chapter Material

Review Questions

1. Give an example of a business problem.

See page 5 for some examples. The answer should focus on the business implications/needs of the problem. For example, the self-insured health insurance program needs to project expenses for the next year based on past claims, changes in employee demographics, and estimated increases in health care costs.

2. What are the main steps followed when solving a problem?

Research and understand the problem, verify that the benefits of solving the problem outweigh the costs, define requirements for a solution, develop a set of possible solutions (alternatives), decide which solution is best, define the details of the chosen solution, and monitor to make sure that you obtain the desired benefits.

3. Define system.

A collection of interrelated components that function together to achieve some outcome.

4. Define information system.

A collection of interrelated components that collect, process, store, and provide as output the information needed to complete business tasks.

5. What are the types of information systems found in most organizations?

Transaction processing system (TPS), management information system (MIS), decision support and knowledge-based system (DSS/KBS), enterprise applications, communication support system, and office support system.

6. List the six fundamental technologies an analyst needs to understand.

Computers and how they work, devices that interact with computers, communication networks, databases and database management systems, programming languages, and operating systems/utilities.

7. List four types of tools the analyst needs to use to develop systems.

Software packages used to develop systems, integrated development environments (IDEs), computer-aided system engineering (CASE) tools, program code generators, testing tools, and documentation support tools.

8. List five types of techniques used during system development.

Cost/benefit analysis techniques, interviewing techniques, requirements modeling techniques, architectural design techniques, network configuration techniques, and database design techniques.

9. What are some of the things an analyst needs to understand about businesses and organizations in general?

The activities and processes that organizations perform, how organizations are structured, how organizations are managed, the type of work that goes on in organizations—finance, manufacturing, marketing, customer service, and so on—and the organizational structure.

10. What are some of the things an analyst needs to understand about people?

How they think, how they learn, how they react to change, how they communicate, and how they work (the variety of jobs and levels).

11. What are some of the types of technology an analyst might encounter?

Desktop systems, networked desktop systems, client-server systems, large-scale centralized mainframe systems, and systems using Internet technology.

12. List ten job titles that involve analysis and design work.

Programmer analyst, business systems analyst, system liaison, end-user analyst, business consultant, systems consultant, systems support analyst, systems designer, software engineer, system architect, Webmaster, Web developer, project leader, project manager, and lead analyst.

13. How might an analyst become involved with executives and strategic planning relatively early in his or her career?

Working on special projects, such as business process reengineering, and working on the information systems strategic plan brings the analyst into contact with top management.

Thinking Critically

- 1. Describe a “business” problem your university has that you would like to see solved. How can information technology help solve it?**

Some likely answers are the following: It takes too long to register each semester (put registration on the Web); information about open seats in course sections is out of date (use real-time updating in the course enrollment database); information about required texts is only at the bookstore (add required text information to the Web so students can purchase texts anywhere); too many parking spaces are sold for student parking lots (develop a DSS/KBS to forecast parking demand and balance the number of permits sold), and so on.

- 2. Describe how you would solve a problem you face. Is the approach taken by a systems analyst as described in the text any different?**

Students’ answers should be based on the steps in Figure 1-1 on page 5. You need to thoroughly understand the problem, verify it is worth solving, define requirements for a solution, generate a list of alternatives, decide which solution is best, define the details of the solution, implement the solution, and follow up to make sure the solution is working. See the “Drama Club Party” discussion question.

- 3. Many different types of information systems were described in this chapter. Give an example of each type of system that might be used by a university.**

TPS: Payroll, accounts receivable, admissions, registration, course add/drop, grade reporting, parking permits, and room and board billing.

MIS: Enrollment summary reports and projections, course enrollment and credit hours by department, GPA summary reports, and financial reports for budgeting and planning.

Enterprise applications: An integrated system that supports admission, course scheduling, tuition payment, financial aid, and housing is a good example of an integrated enterprise application that spans many organizational functions and departments.

DSS/KBS: Course scheduling and parking permit sales.

Communication support systems: E-mail, fax, and Internet access for students, staff, and faculty.

Office support systems: Desktop systems for faculty and staff, document management for faculty handbooks, academic affairs, and student affairs, and campus calendar planing and updating.

- 4. What is the difference between technical skills and business skills? Explain how a computer science graduate might be strong in one area and weak in another.**

Discuss how the preparation for a CIS or MIS degree is different from the preparation for a computer science degree.

Technical skills involve understanding and using technology, including specific computer hardware and software. Business skills involve understanding business organizations in general and how they operate, including knowledge of functional areas, such as accounting, finance, marketing, human resources, production, and so on. Computer science graduates are very strong in technical skills; however, they have not studied management, accounting, finance, or marketing. Therefore, they will have more difficulty understanding the business problems faced by organizations. CIS and MIS graduates study both technology and business, so they are better prepared to understand business problems and the needs of end users.

5. Explain why an analyst needs to understand how people think, learn, react to change, communicate, and work.

Many business problems require support for communication and decision making of users. Analysts need to understand human decision making and thought processes in order to provide support for the problem. They also need to understand the limitations of human thinking and memory when designing the user interface. On a political level, it is important to understand how people think to be able to predict their attitudes and reactions to problems and solutions provided. System developers need to make systems easy to learn and use, as well as provide help and training resources for users. Therefore, they need to understand how users learn. Because any new system (or change to an existing system) involves change, it is important to understand how people view and react to change so the developers can overcome resistance and help users deal with change.

Analysts need to get information from users throughout the project, so they need to understand how people communicate. Additionally, the analyst needs to present information to users in oral and written form, so it is important to master communication skills. Most information systems are designed to support the work of users, so the analyst needs to understand what users need to do to complete work tasks. Additionally, analysts need to understand the users' preferences for how they do their work.

6. Who needs greater integrity to be successful, a salesperson or a systems analyst? Or does every working professional need integrity and ethical behavior to be successful? Discuss.

The analyst should have high ethical standards. But then again, all business professionals need strong integrity, including salespeople, to be successful.

- 7. Explain why developing an information system requires different skills if the system is client-server versus large-scale centralized mainframe architecture.**

Students should address the reality that there is a lot to know about technology. Developing a system requires knowledge and skills related to the specific technology. No one person can master all types of technology, but, for example, if the analyst is working on designing and implementing a system with client-server technology, he or she needs to understand all the details about how client-server architecture works. Most people begin to specialize in types of technology for this reason. But it is important to keep learning about new technology because technology is always changing.

- 8. How might working for a consulting firm for a variety of companies make it difficult for the consultant to understand the business problem a particular company faces? What might be easier for the consultant to understand about a business problem?**

A consultant will not know much about the strategies, history, or culture of the client company, so understanding a business problem specific to the company is more difficult. On the other hand, the consultant will be more familiar with general industry problems and solutions and may have encountered a very similar problem in the past. If this is the case, the consultant may be able to understand the company's specific business problem easily.

- 9. Explain why a strategic information systems planning project must involve people outside the information systems department. Why would a consulting firm be called in to help organize the project?**

Consultants specialize in managing the planning process. They are generally brought in from outside the company to train the staff and lead the effort. Sometimes it is better to have an outsider direct a controversial project because people can feel threatened by change. Additionally, people in all functional areas of the company are necessary because they best understand the need for information systems support. Finally, top management is needed to encourage the participation of everyone and to define the direction of the company.

- 10. Explain why a commitment to enterprise resource planning (ERP) is difficult to reverse once it has been made.**

ERP involves committing to adopting a set of integrated packages for major information systems support. Once the packages are installed, it is difficult to go back to the prior way of doing business. In addition, the business often has to change the way it operates to conform to the ERP system, making it even more difficult to go back. Finally, the large investment that was made to implement the system makes it awkward for management to admit they made a mistake.

Experiential Exercises

- 1. It is important to understand the nature of the business you work for as an analyst. Contact some information systems developers and ask them about their employers. Do they seem to know a lot about the nature of the business? What types of classes did they take to prepare themselves (for example, banking classes, insurance classes, retail management classes, hospital administration classes, manufacturing technology classes, and so on)? Do they plan to take additional courses? If so, which ones?**

Students should find that analysts: 1) know a lot about the business, 2) took some classes related to the specific industry, and 3) probably think it would help to take more. This is an opportunity to debate about the importance of general business courses versus information systems courses versus industry-specific experience.

- 2. Think about the type of position you want (working for a specific company, working for a consulting firm, or working for a software package vendor). Do some research on each type of position by looking at employers' recruiting brochures or Web sites. What do they indicate are the key skills they look for in a new hire? Are there any noticeable differences between consulting firms and the others?**

Most employers will emphasize problem-solving skills and communications skills, along with a balanced technical background that provided by a CIS/MIS major. Most will offer training in technology and will be less concerned about specific languages and environments. Consulting firms will be similar to any other employer with even more emphasis on understanding the business problems faced by clients.

- 3. You read an overview of the Rocky Mountain Outfitters strategic information systems plan, including the technology architecture plan and the applications architecture plan. Research system planning at your university. Is there a plan for how information technology will be used over the next few years? If so, describe some of the key provisions of the technology architecture plan and the applications architecture plan.**

Most colleges and universities will have a strategic plan, and we suspect most will include sections that address information technology. Issues involve computer use by students, computer support for courses, distance learning and Internet-based courses, Web-based applications and financial aid, Web-based course registration, and so on. A technology architecture plan would address issues of hardware and network infrastructure and the approach taken to systems. The applications architecture plan would detail the specific systems to be enhanced or added at the college or university.

Case Studies

Case Study: Association for Information Technology Meeting

Three information systems professionals discuss what they look for when interviewing college students for positions in their firms.

- 1. Do you agree with Alice and the others about the importance of problem-solving skills? Industry-specific insight? Communication skills? Discuss.**

We agree with Alice. Asking job applicants questions about how they solve problems in general and how they would solve industry-specific problems (for example, problems related to the banking industry) reveals much about the maturity and potential of the job applicant.

- 2. Should you research how a hospital is managed before interviewing for a position with an information systems manager at a hospital? Discuss.**

We think the student should research the industry of a company before interviewing. First, the student should know whether the industry is appealing. Because much time is spent working with people involved in the industry, it helps if the industry is interesting. Second, it gives the interviewer the feeling that the applicant cares about the job. Third, it allows the applicant to ask meaningful questions about problems and opportunities in the company. When the interviewer starts talking about a specific system, the applicant will know something about the problem solved by the system.

- 3. In terms of your career, do you think it really makes a difference whether you go to work for a bank, a hospital, or a retail chain? Or is any information systems job going to be the same no matter where you work? Discuss.**

We think this is important for students to understand. If you go to work for a bank, you eventually might think of yourself as a banker. If you go to work for a retail chain, you might begin to think of yourself as a retailer. Information systems employees have loyalties to the IS field but also to the industry and company they work for. Because expertise about the industry is so important and takes time to develop, it is often difficult to switch industries mid-career. Students should give this some thought.

Case Study: Rethinking Rocky Mountain Outfitters

RMO's strategic information systems plan calls for building a new supply chain management (SCM) system prior to building the customer support system (CSS). John Blankens has stated often that customer orientation is the key to success. If that is so, why not build the CSS first, so customers can immediately benefit from improved customer ordering and fulfillment? Wouldn't that increase sales and profits faster? RMO already has factories that produce many items RMO sells, and RMO has long-standing relationships with suppliers around the globe. The product catalog is well established, and they have existing customers who appear eager and willing to shop online. Why wait? Perhaps John Blankens has made a mistake in planning.

1. What are some of the reasons that RMO decided to build the supply chain management system prior to the customer support system?

Reliable and efficient inventory management is needed first so that customer demand can be satisfied when the CSS is implemented. The classic mistake is to advertise the product widely on the Web but not be able to supply the product or service the customer after the sale. Supply chain management will prevent these problems.

2. What are some of the consequences to RMO if it is wrong to wait to build the customer support system?

Customers might shop elsewhere, sales would be lost, competition could overtake RMO, and so on. But existing phone and catalog sales and the existing Web site with product information are still available while the CSS is being built.

3. What are some of the consequences to RMO if the owners changed their minds and started with the customer support system before building the supply chain management system?

As discussed in Question 1, the classic mistake is to advertise the product widely on the Web but not be able to supply the product or service the customer after the sale.

4. What are some other changes that you might make to the RMO strategic information systems plan (both the applications architecture plan and the technology architecture plan)? Discuss.

This is an opportunity to debate the preferred hardware/software platforms and architectures to use both today and in the future. Is everything moving to the Internet and Web-based technology? Are package solutions the best choice? For applications architecture, the order of system projects could be debated. Should you store systems first? Accounting and finance first? Why have SIMS at all? Are CRM and SCM philosophies just more silver bullets sold by consulting firms?

Case Study: Focusing On Reliable Pharmaceutical Service

Reliable Pharmaceutical Service is much smaller than Rocky Mountain Outfitters, the company discussed in this chapter. But the organization still requires an integrated set of information systems to support its operations and management. We include a case study at the end of each chapter that applies chapter concepts to Reliable Pharmaceutical Service.

1. How many information systems staff members do you think Reliable can reasonably afford to employ? What mix of skills would they require? How flexible would they have to be in terms of the work they do each day?

The new strategic plan increases Reliable's emphasis on streamlining operations, presumably through increased application of computer technology. Thus, the issue is less a matter of how many staff members Reliable can afford than of how many staff members are required to execute the strategic plan in the short- and long-term. The issue of affordability is one that must be addressed with respect to the revenues and profits that Reliable anticipates after the strategic plan is implemented.

The strategic plan will greatly increase Reliable's dependence on computer technology for day-to-day operations. Given the nature of its business, Reliable cannot afford service outages related to system downtime for any significant length of time. Thus, staff will need to be available in all service areas to respond immediately to problems and get systems back up and running. This will require a dedicated staff member in each service area who can respond quickly to local problems such as hardware and network failures. These staff members will need wide-ranging skills, including the ability to install, configure, and troubleshoot hardware and software at service area offices, administer and troubleshoot LANs, and communicate effectively with users, managers, and technical staff in other service areas and company headquarters.

Reliable will also require one or more staff members to maintain its application software and the infrastructure (if any) that provides access to that software from local service area offices. The number and duties of these staff members will depend on how the system is deployed and maintained. If the system is operated from a centralized location with WAN access from local service areas, then the skills required will include network administration and troubleshooting, server administration and troubleshooting, and operational skills for the application software. If Reliable develops and maintains its own application software, then in-house staff will also need to be well trained analysts and programmers. It's unlikely that one person could handle all of those duties, so there would be probably be two or three positions with the following specializations:

- Network and server operations
- Application software operations and user support
- Application software maintenance and development

If the application software is distributed to each local service area, then skills in the first two groups above will need to be distributed to each service area. Depending on office

and service area size, one or two staff members would be required to handle all duties within each service area.

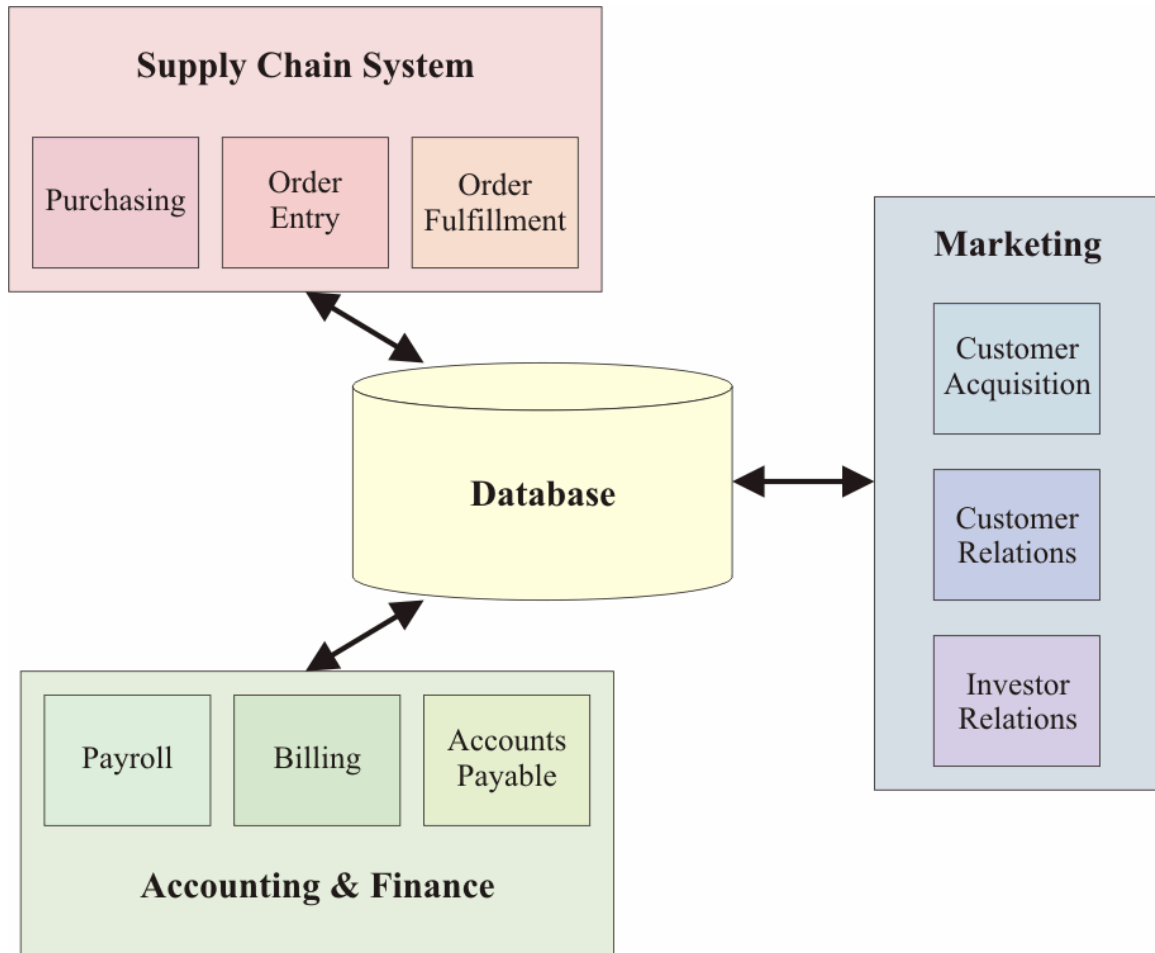
Given the wide range of responsibilities and relatively small number of staff, all staff members would need to be flexible and cross-trained wherever possible. For example, under the centralized approach, the three staff members would need to back up one another to ensure operational continuity during vacations, out-of-town training, and sick leave. Personnel might also need to be shuffled among service areas for similar reasons. If there were enough service areas, perhaps a fourth staff member would be employed at the central location but rotated out to distant service areas as needed.

2. What impact would Web technology have on the way Reliable deploys its systems? Would the Web change the way Reliable does business?

Reliable contracts its services to health care facilities, making it a part of many virtual organizations. Web-based technology is a key enabler of virtual organizations, enabling separate organizations to operate as if they were a single integrated whole. For example, Web-based technology will enable a doctor at a client health care facility to create or modify a prescription from a local computer. Prescriptions must seamlessly flow to Reliable so that they can be filled, and orders must be automatically sent to pharmaceutical suppliers to replenish depleted stocks. The operational efficiencies envisioned by Reliable's strategic plan can only be achieved by Web-based technologies. In essence, Reliable must use Web-based technology to integrate itself, its suppliers, and its customers into a seamless supply chain that integrates pharmaceutical manufacturers, pharmacists, health care providers, and patients.

3. Create an application architecture plan and a technology architecture plan for Reliable Pharmaceutical Service to follow for the next five years. What system projects come first in your plan? What system projects come later?

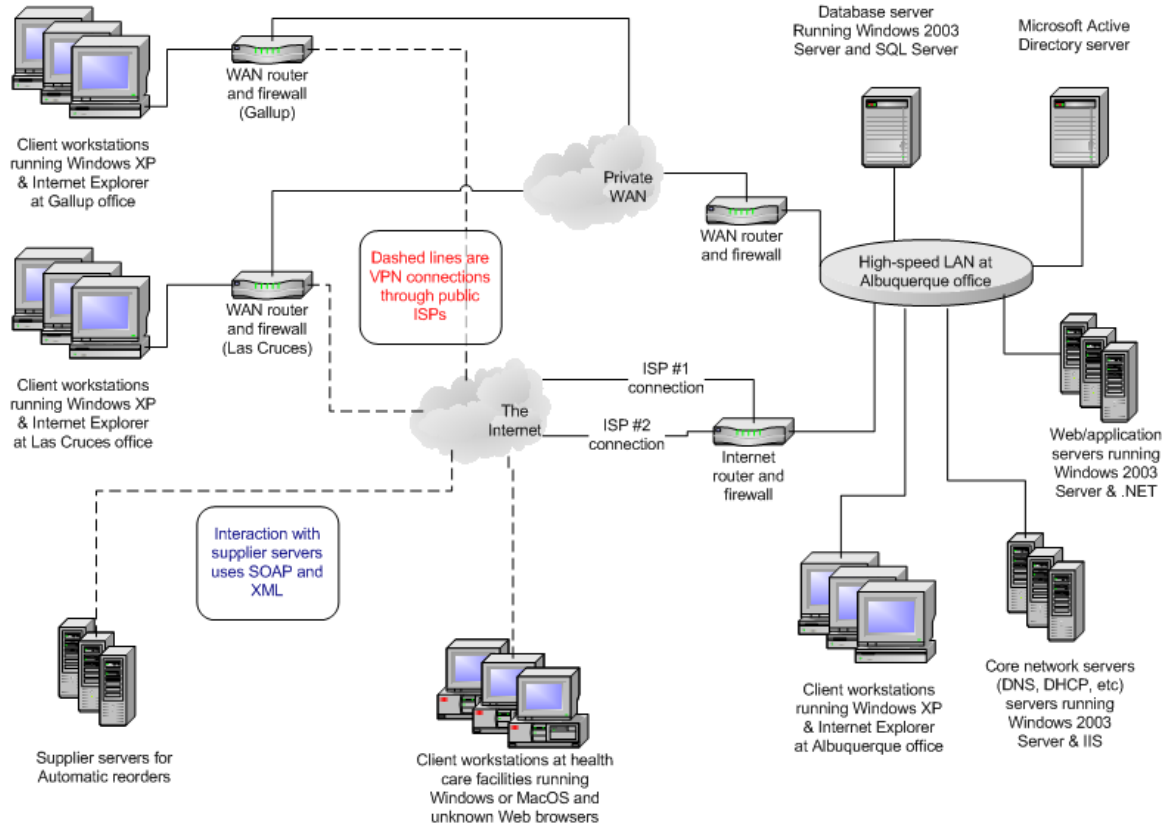
The figure below shows one possible application architecture.



The architecture divides applications into three primary systems and shows three possible subsystems for each. An integrated database supports all three primary systems, thus ensuring seamless data interchange.

Some subsystems, such as purchasing and order entry, must be integrated with external systems, which in turn creates additional interfaces and dependencies not shown in the figure. In addition, some subsystems, such as order entry, may require multiple interfaces or versions to support different operational models, such as orders received by telephone versus orders received through a Web-based application.

The figure below shows one possible technology architecture that supports the application architecture.



The architecture assumes that most application and database services will operate on servers in the Albuquerque office. Other service area offices will connect to the Albuquerque Web and application servers over a private WAN with failover connections via VPNs on the public Internet. The internal applications, database, and client interactions will be based on Microsoft .NET (SOAP) running over standard Internet services that employ VPNs and firewalls for added security.

Health care providers will interact with the order entry system via standard Web browsers and VPNs. Reliable will interact with suppliers via SOAP messages, XML documents, or both, also using VPNs. Supplier interfaces will be custom designed, depending on the requirements and capabilities of each supplier.